PLASTIC®
ENERGY

Agenda

- Who is Plastic Energy
- PE Technology and Feedstock
- What Have We Accomplished
- PE Future Plans

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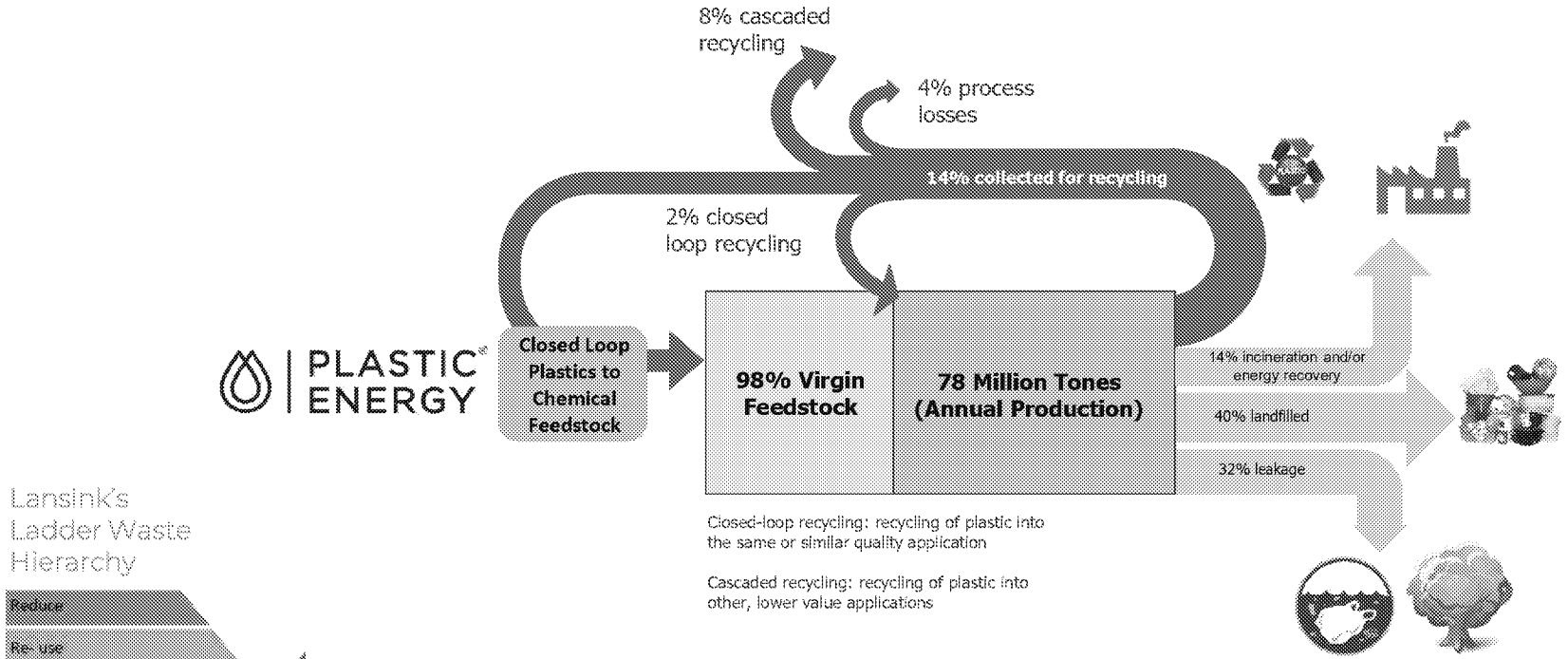
Advancing a Circular Economy



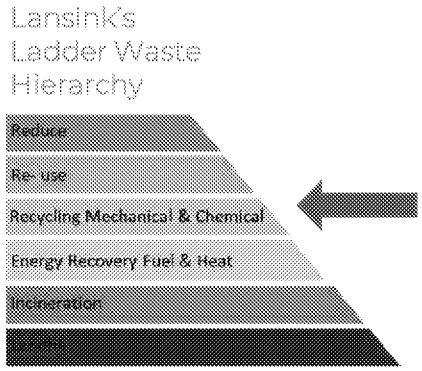
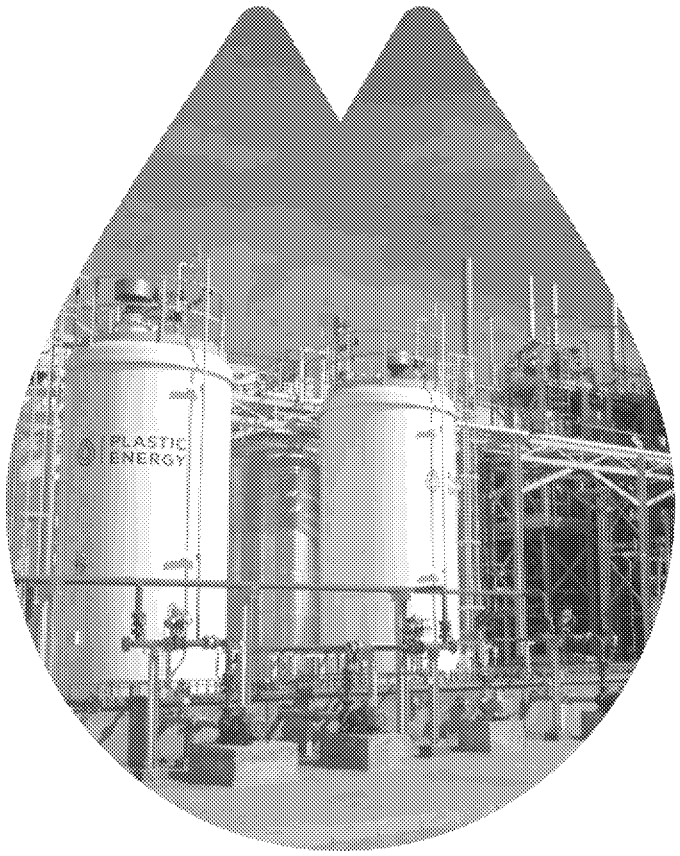


Figure adapted from Ellen MacArthur Foundation: https://www.ellenmacarthurfoundation.org/our-work/activities/new-plastics-economy/2016-report

PE Solution

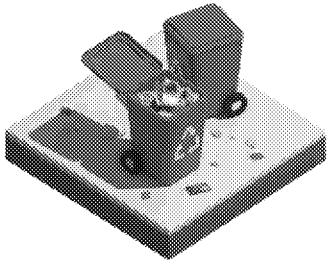


We are the only Global Company that has successfully and consistently produced enough chemical feedstock (oil) to enable conversion back into plastic.

- ✓ Global HQ is in the UK
- ✓ Patented process → Thermal Anaerobic Conversion (TAC)
- ✓ Own & operate 2 plants → Seville and Almeria (Spain)
  - 3 years operation and ~ 30 tons/day of waste processed
  - Yield is ~70% by volume of TACOIL™
- ✓ Product sold to major chemical and integrated energy companies for fuel blending and plastic production

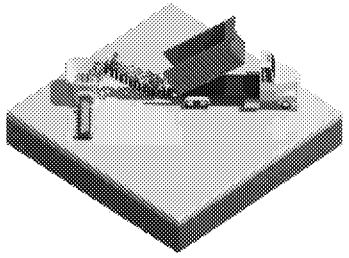
PE Technology

01 — Feedstock



We receive raw **end-of-life or contaminated plastic waste** from municipal recovery facilities and recycling factories. **It is delivered in a form that can be readily managed.**

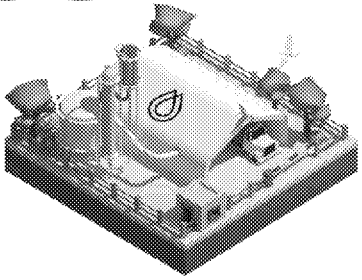
02 — Mechanically Recycled Feedstock



The feedstock is subjected to a pre-treatment to remove some components and meet the quality control standards to feed the plant.

This process:
- Removes metals, heavier plastics and materials, as well as the humidity left in plastic.
- Keeps the types of plastic that we can process (LDPE, HDPE, PS, PP).

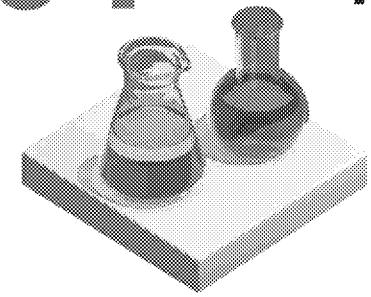
03 — Plastic Energy



THERMAL ANAEROBIC CONVERSION (TAC)
The feedstock (waste plastic) is heated in the absence of oxygen until it melts and the polymer molecules break down to form a rich saturated hydrocarbon vapour.

As a result of this TAC process, the condensable gases are converted to hydrocarbon products while the non-condensable gases are collected separately and combusted to process energy.

04 — Naphtha And Diesel



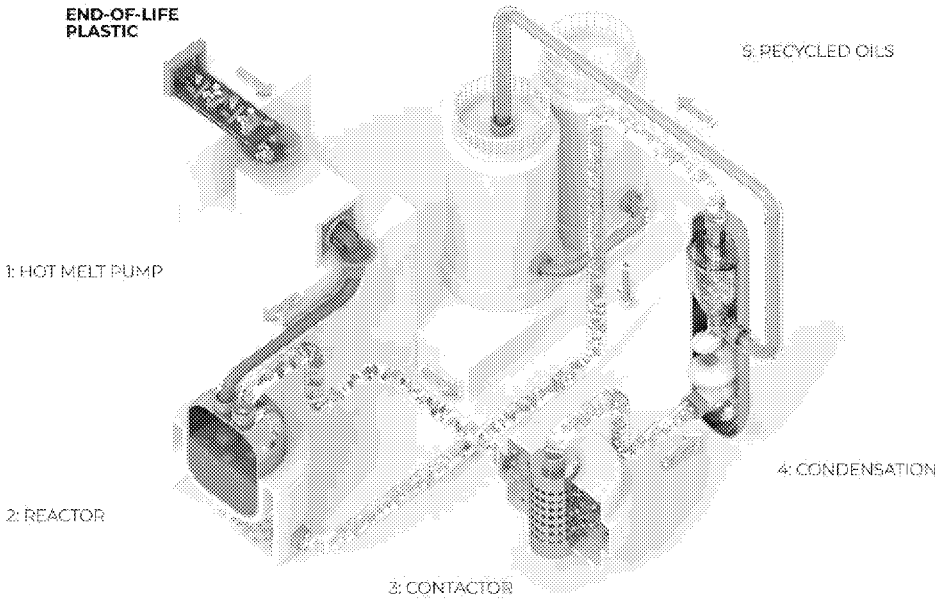
The **atmospheric distillation columns** receive the hydrocarbon vapour and according to molecular weights separates the **vapour into raw diesel** (greater molecular weight accumulating at the bottom), **light oil** (at the middle), and **synthetic gas components** (at the top).

For more details about the technology: www.plasticenergy.com/technology

WE HAVE OPERATIONAL EXPERIENCE WELL-PASSED THE LAB

Technology highlights

- Robust and uncomplicated
- Semi-batch process based on operational experience
- No additional substances necessary
- Uniform and stable heating is essential for a controlled and consistent product
- Relatively mild temperature and low pressure
- Novel process solutions for heat utilization and energy recovery
- Practically energy neutral in the chemical process
- Modular system: Thermal process well-suited for scaling
- Patented in the EU & US



Product - TACOIL

- Each tonne of plastic waste chemically recycled will produce approx. 850 litres of TACOIL
- Output replaces fossil oil in the cracker

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What is PE Feedstock?

Reality check

- We cannot take all plastics!
- Feedstock with no or little value from municipal waste
- No need to wash or separate by polymer-type
- We can take a broader feedstock than below but it means lower yields

Ideal feedstock

- LDPE
- HDPE/PP/PS
- Limited moisture and contamination
- Apply pre-processing mechanical recycling techniques to achieve our feedstock specification

Non-desirable feedstock

- PET
- PVC
- EPS
- Category 7

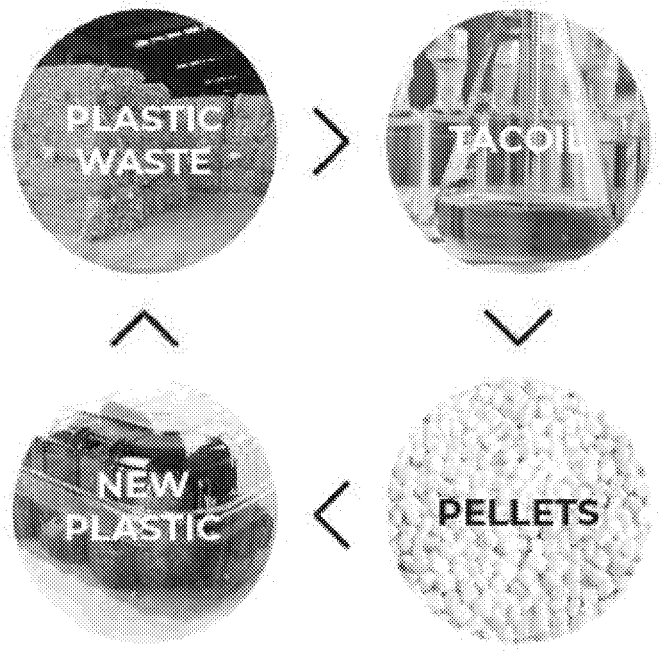
A Flagship Example

- CIRCULAR POLYMERS :

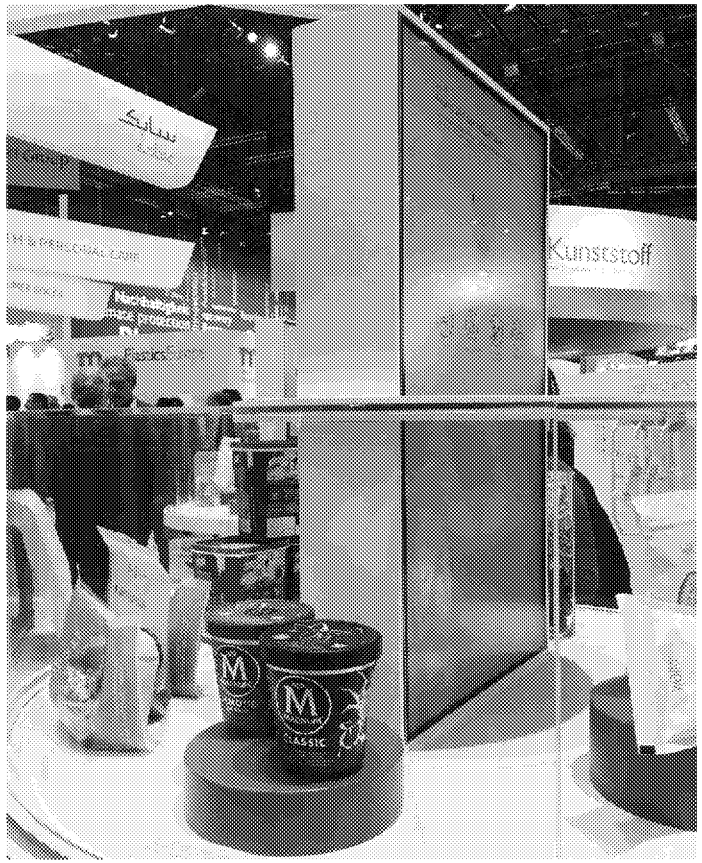
  1ST company worldwide having validated the circular economy of end-of-life plastics.

  - Announced at Davos 2019
  - Renewi, PLASTIC ENERGY, SABIC, Unilever / Vinventions / Walki Group
  - Certified circularity and traceability by ISCC+
  - Recycled content following mass-balance approach

- PROPERTIES:
  - Virgin quality oil made from end-of-life plastic waste
  - Food-grade packaging
  - Endless recycling without degradation



COMMERCIALIZATION OF FOOD-GRADE PACKAGING WITH RECYCLED CONTENT FROM TACOIL



K TRADE FAIR October 2019

Food-grade packaging from recycled content from Plastic Energy's chemical recycling plant, commercialized on the European market

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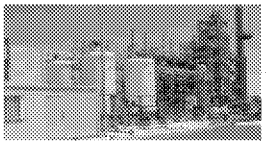
PE Plants

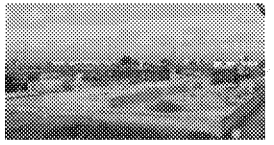
Almeria (SP)

- Plant commissioned in 2015.
- First one in Europe with the REACH certificate.



Seville (SP)

- Plant operating since 2017
- Incorporates several improvements over Almeria



Tenerife (SP)

- Sustainability project

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FRANCE

Signed: Q1 2019;
- Focus: Plastic2Plastic

Geleen (NL)

Signed: Q4 2018;
- MoU signed with SABIC for building a large scale plant
- Focus: Plastic2Plastic

سابك
sabic

Malaysia

Signed: Q2 2019;
- MoU signed with Petronas for building a large scale plant
- Focus: Plastic2Plastic

PETRONAS

Indonesia

Signed: Q1 2019;
- MoU signed in West Java for the construction of 5 plants

Future Plans

- Build 10 – 20 plants over the next 5 years promoting plastics to feedstock or option for plastics to fuel based on regional needs, across 3-4 continents
- Expand operations to the US
- Continue advocacy for chemical recycling globally
- Work with value chain to continue to advance and advocate for the circular economy

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www.plasticenergy.com